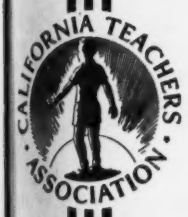

California JOURNAL OF EDUCATIONAL RESEARCH

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- Digests of papers presented at the 1952 CERA Conference.
- Book Reviews

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THE EDITORS SAY:

An Educational Barrier*

ALL successful American business men know cost accounting accurately. They know how much things cost, how much it costs to sell each article, and the overhead cost of operation down to pennies. Industry has achieved remarkable perfection in the mass production of interrelated parts and is now able to hold the allowable tolerances down to one, two, and three ten-thousandths of an inch. In every line of endeavor, instruments for the measurement of quantity and quality are finding more and more use as production schedules are increased.

In the field of education, we have developed many excellent instruments with which we can measure with reliability many of the characteristics, interests, ability levels, achievements, attitudes, and other factors involved in the educative process. Many of these instruments have been borrowed by large corporations and are being used with outstanding success in the solution of personnel problems; fitting the man to the job, training the man in the job, and predicting advancement potential. We who developed these techniques in the supporting instruments lag far behind in their successful use.

As designers of faster and faster man-carrying airplanes contemplated the penetration of the sonic barrier, their apprehension regarding what might happen to such a machine when it finally exceeded the velocity of sound was reflected in their theories predicting complete disintegration of the machine at the instant it passed the barrier. But these predictions did not prove to be true. Daily, men are accomplishing this fete of speed without any apparent ill effects to either man or machine.

One of the barriers which education faces today is a means of accurate analysis and appraisal of the individual's ability to learn whatever is our responsibility to teach him. Does the profession of education have in its possession at this time the instruments, ability, and fortitude to cross this barrier that now bars our progress? Are we ready to pinpoint our efforts in the education of the individual? If we are able to answer these questions in the affirmative, a way must be found through our combined cooperative efforts to pass this barrier in education.

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*(The above editorial was written by F. Eugene Mueller, Superintendent of Schools, San Bernardino, California, and appeared originally in his monthly bulletin, *Passing Marks*, May 1952. It is being used as the guest editorial in this issue of the *Journal* with Mr. Mueller's permission. — Ed.)

Cybernetics and the Educative Process

RICHARD D. MOSIER
University of California, Berkeley

The Concept of Cybernetics

With the publication of Professor Norbert Wiener's treatise on *Cybernetics: Control and Communication in the Animal and Machine,* there is opened up to us a new range of investigation within the organon of educational science, an area of study and methods of research which this observer believes represent no less than a revolution in the scientific study of education. Cybernetics offers us a new approach to the study of the human mind and behavior, a study which is based on a comparative investigation of the electrical circuits of the nervous system and those in the highly complex mechanical brains of gigantic electrical calculating machines. Such a study, of course, opens equally promising vistas to the physiologist and the engineer. But for the educator, the new science means that now there is opened up to us a route of investigation and research which will link the science of education with all the physical and biological and social sciences which take cybernetics as the thread of continuity leading from one to another.

The word *cybernetics* was coined by Professor Wiener and his circle of investigators from the Greek word *Kybernetes,* meaning steersman; and by derivation from its Latin corruption came the term *Gubernator,* sometimes used to designate certain types of control mechanisms. The English equivalent, of course, is the term *governor;* and the educational historian will recognize immediately that from the days of Plato and Aristotle through the period of the Renaissance, educational works always centered on this key concept. In ancient classical times ,and later in the Renaissance revival of classical education theory, education was conceived in the light of the term *governor,* or sometimes as a mode of government. The term *cybernetics,* then, if it is linked with the history of the conception of education as government, provides us with an appropriate orienting concept for the future research of educational science.

Richard David Mosier is assistant professor of education at the University of California, Berkeley, where he has taught for the past six years. His previous professional experience includes public school teaching, and college teaching at the University of Texas and Columbia University. His Ph.D. was earned at Columbia University in 1946. The author believes that his article is the first to bring out the educational implications of the theory of Cybernetics.

The Mechanism of Purpose

The concept of a feed-back system, so essentially implied in the new science of cybernetics, and represented by the steering mechanism of a ship, the automatic pilot of the airplane, the governor of a steam engine, etc., all of which operate upon a response to information fed back to a mechanism already engaged in fulfilling some digested purpose or function, parallels in education the voluntary activity of the nervous system and the brain mechanism when these are subjected to the concepts, symbols, and gestures which represent reports or intelligence being fed back into the mechanism as a consequence of the purposive activities in which it is engaged. The science of cybernetics thus far is in elaboration and quantification of this main point, that the voluntary activity of the nervous system operates on a principle analogous to the negative feed-back system, say, for example, of a thermostat.

It would appear, on this principle, that the activities of the organism are regulated by the decrease at each stage signaled back to the muscles and nervous system; that this information or intelligence with reference to the goal constitutes a kind of feed-back system in which the decrease in activity or range is a rough measure of the distance from the goal. The principle can be illustrated and tested most adequately, of course, within the complex of simple mechanical activities; but in application at the level of the higher mental processes, it leaves us with what Professor Wiener has called a "mechanism of purpose." However that may be, it is clear that we are on the threshold of a revolutionary change in the scientific study of human behavior, and that the science of education, in its alliance with the related social and biological sciences, must share in and appropriate the results of these other disciplines.

Habit As Inference

The translation of these suggested principles into the problems which lie at the heart of the educative process is roughly the problem of translating teleology into mechanism, of translating "subjective" educational psychology with its elaborate digests of purposes, goals, and "instincts" into the cybernetics and the mechanism which feeds and produces them. This task may seem insuperable as long as fixed habits of thought, custom and tradition, and intellectual inertia keep us from approaching human behavior in the light of the new science; but it does seem to this observer that there is no way out of the present educational confusion except by abandoning our customary approach to the study of educational problems in favor of the new avenues of study which the science of cybernetics suggests to us.

These avenues open up to us a field of study which will correlate

organic changes in the body mechanism with the formulation of new goals and purposes, and which necessarily includes therefore an organization of the curriculum and an orientation of teaching method in the light of parallel developments in the construction of complex calculating and "thinking" machines. To this observer, it would seem there is no other way to construct a complete science of education, to link it with complementary biological and social sciences, and to build a complex technology of education.

In one final particular the relationship between the new science of cybernetics and the scientific study of the educative process may be suggested. It occurred to me, since habit is the key concept in studies of human behavior, and since, moreover, the path of our research must link up a calculus of reasoning with the fragments of human behavior, that a way of linking mathematical logic to the science of cybernetics would be to abandon the stereotyped view of habit propagated by the last generation of psychologists in favor of a newer concept suggested by the foregoing considerations.

If a habit is a tested and embodied inference, if it is conceived that way, then we are prepared to unite all levels of human and mechanical behavior, higher and lower, physical and "spiritual," mechanical and purposive, upon one level, thus greatly simplifying and unifying all the studies which compact together to form the science of cybernetics. If habit, then, is conceived as a tested and embodied inference, the whole of modern mathematical logic lies before us as a higher dimension of conception for representing the mechanism of human behavior, whether at a mechanical and physical level or at the highest ranges of the most complex and creative human thought.

Logic and the Educative Process

Modern mathematical logic reduces the relations studied in traditional logic to a fundamental logical relation, that of inclusion, from which it follows that modern logic is primarily a logic of functions. This field of study produces a wide range of formulae to describe the formal properties of logical composition, and presupposes that inferential processes have one or more invariants which can be followed through various transformations. If we are given a universe of discourse, say a subject matter, we can follow the transformations of the system in terms of the invariants to which it is subject, and derive from these invariant properties, in relation to the system as a whole, a scheme of formulation which expresses the general logical properties of the subject.

It follows that any subject matter whatsoever can be studied in this light, and that, with the aid of formulae developed in modern mathematical logic, the fundamental logical structure of the subject matter can be systematically analyzed. The advantage of such an approach in inves-

tigating the means by which a given subject matter can most effectively be taught ought to be obvious; but suffice it for the moment to say that such a standpoint makes it possible for the first time to give a complete scientific determination of the relations which are to be learned, and puts in our hands the instrument with which to measure the precision of physical science the amount and the quality of the learning which is desired.

The Technics of Education

Consider for a moment what results are obtained if the form of a subject matter is viewed in the perspective of the logic of probabilities. If we construct a calculus in which the certainty of truth and the certainty of falsity are represented by numbers *one* and *zero*, while fractions having values intermediate between them indicate the degree to which the evidence is of *one* or *zero*, we are prepared to face the problem of determining the numerical probability that a possible fact will lie within the range of a given set of facts. The probability, then, would be a fraction whose numerator is the frequency of a specific kind of event, and whose denominator would be the frequency of a class of events which embraces events of the kind in question.

Probability thus depends upon the relative frequency with which events of a specific kind fall within the range of a class of events determined upon as the leading principle. In this context, then, an inference of the *first* order recognizes only the inclusion or non-inclusion of one class in another; it is absolutely certain, in contrast to inferences of the *second* and *third* orders which are only probable, that is, which take into account the proportion of one class which is contained in a second. If we employ the theory of probabilities in the construction of a scale to represent the three orders of inference as they are found in a given subject matter, we should be in a position to express the formal properties of the subject matter in a purely quantitative way. In brief, we should have before us a kind of group or statistical mechanics such as is found in modern physics, or perhaps a quantitative logic of functions.

Whoever can perform the operations indicated and derive the formulae from them will have the equivalent of an educational physics. Whether or not the theory of group mechanics applies in the field of logic, it has been observed that inferences of the different orders behave like the transformation groups of statistical mechanics, with all the appurtenances of their linear and metrical invariants. Though this development is at the moment extremely tenuous, it appears that we must find a way of equating the terms which are common to group mechanics and to the logic of functions. Such a development, of course, would be a sound theoretical basis upon which to build an educational technics, and would provide the necessary conceptual link between cybernetics and the scientific study of education.

Some Current Research in Television for Children

MAY V. SEAGOE
University of California, Los Angeles

RESEARCH in television in relation to children is setting out on the familiar road traced by investigations of reading interest, movies, radio and comic books. When we first become conscious of a new major influence on the lives of children we tend to view it with alarm, to conjecture, to state individual points of view, perhaps even to impose restrictions. As we gain information we become aware of the complexity of the problem. With the extension of television channels to new areas in the next few years, we will enter another cycle of learning to live and work with an important educational agent.

Interest of Children's Theater Conference

Awareness of this problem led the *Children's Theater Conference* of the American Educational Theater Association to sponsor a "Workshop on Psychological Aspects of the Child Audience in Film and Television" at its annual meeting in August, 1951. There members of the Conference met with representatives of the television industry, parents and recreational workers, child psychologists, and children to explore the issues involved. Out of those meetings came two exploratory studies, and two statements of issues and problems.[1]

Children's Listening Habits

First of all, information about television listening habits and their relation to age, socio-economic status, type of program and the like was

[1] More complete reporting of the material gathered for the Workshop will be found in a series of four articles: "Children's Television Habits and Preferences," *Quarterly of Film, Radio and Television*, 6, 143–153, Winter 1951; "A Score Sheet for Children's Television," *Quarterly of Film, Radio and Television*, publication arranged for Spring 1952; "Issues and Criteria for Children's Television," *Educational Theatre Journal*, publication arranged for Fall 1952; and "What to Do about Children's Television," *Pi Lambda Theta Journal*, publication arranged for Fall 1952.

May V. Seagoe is professor of education at the University of California, Los Angeles, where she has taught since 1934. Dr. Seagoe had previously served as an elementary teacher, a teacher of remedial reading, a counselor in the Los Angeles City Schools, and as a director of research. She was national president of Pi Lambda Theta, honorary education fraternity, from 1945 to 1949. Her Ph.D. degree was earned at Stanford University in 1934.

gathered from 323 children in four school districts in Los Angeles County. Children in the kindergarten and primary grades were interviewed; those in upper grades filled out questionnaires. In the sample, the average child reported a movie every two weeks, radio listening an hour a day, ownership of a television set (62 per cent) and television watching more than two hours a day, and no theater experience. The time spent with all media increased with age, and those from low socio-economic areas used the television more than those from high socio-economic areas. A comparison of those who owned television sets with those who did not showed those who owned sets attended movies less often, listened to radio much less, and spent much more time watching television. Analysis of program preferences showed points of appeal similar to those found in studies of reading, movies and radio, i.e., adventure, comedy, westerns and family shows. An exploration of frequency of mention as "favorite" compared to frequency of viewing showed no relationship, suggesting that programs seen often mirror a family compromise rather than true child preference.

Score Sheet for Television

An attempt was made to develop a rating scale by which any adult might judge how good any television program or movie is for children. University students were used as observers, exploring children's reactions and filling out a "Score Sheet" for each film at two shows at commercial theaters, and doing the same thing at television parties for children in their own homes. An item analysis of the scale was based on average ratings of all observers for each show, and using stated preferences of children present as a criterion. The revised scale was then used modified by the Workshop personnel. The "Score Sheet" constitutes a crude initial research instrument, a guide for producers, and a discussion-provoking techniques for use with teacher and parent groups. As it was developed it became clear that the child needs a leading character with whom he can identify, emotional involvement, an identification character who wins, a plot that is simple and straightforward, open and overt adventure, a fairly high degree of realism, an idea of personal or social significance implicit in the story line, plenty of dramatic action rather than dialogue, direct presentation and high professional quality, and opportunity to participate or to play out the show.

Issues and Problems

The Workshop itself brought together representatives of the industry, psychologists, and other interested adults to explore similarities and differences in point of view and to formulate criteria. It was agreed that no additional code is needed for television, but that standards of production should be raised by the joint effort of producer and consumer. Issues

stressed included the need of the child for freeing his energies hour by hour, to experience adventure, to free himself from dependence on adults and to relate to children his own age, to develop his own behavior norms and standards rather than having them imposed, to develop a "self" concept through vicarious experience and to escape unpleasant personal situations. Differences between the interests of individual children with age, sex, individual experience background, and intrinsic interest were recognized. Fundamental principles of presentation mentioned included the need for simplicity and strong patterning of the show, ideas that are somewhat familiar, and good production standards. The producers explained the commercial nature of the television industry and the complexity of the technical problems. All agreed that combined effort on the part of everyone interested in children's television is essential in working toward a solution of the issues involved.

Action Program

From the Workshop also came suggestions for an action program related to children's television. All agreed that, even with the best of programs, teachers and parents must do much in helping individual children digest what they see and hear, and producers recognized the need for greater awareness of the needs of children in the shows they produce. It was pointed out that teachers can encourage organizations of parents to study children's programs, report their own uses of television in educational periodicals, encourage children to discuss the programs they see, and ask that teacher training institutions give attention to television appreciation. Parents can ask schools to teach television appreciation, watch television with their children, encourage children to talk out what they see, write the sponsor and the producer giving specific criticisms or endorsing good shows, set up listening groups to evaluate programs, initiate a "Radio–Television Council" in each area, plant stories in local papers about children and television, and cooperate with the local press in calling attention to entertainment acceptable for children. The industry can support parent and teacher groups in their activities, sensitize all those producing shows for children to the unique needs of the child audience, and work with adult groups to establish a clearing center for children's shows.

Research Need

The investigations and discussions reported here are admittedly crude. Pioneer efforts are an essential first step in any area in order to chart problems and suggest directions for more careful work. Within the next few years much more refined research will doubtless occur. Then we will know how to use this important new tool in enriching the over-all educational experiences of children.

A Critical Evaluation of the Student Council in the High Schools of California

ELON EARL HILDRETH
San Mateo Junior College

THIS study was undertaken for the purpose of investigating the extent and effectiveness of student participation in the high schools of California. Specifically, it undertook (1) to survey present practices, (2) to investigate the aims sought in the employment of student participation, (3) to present standards or criteria of good student council organizations, (4) to present the history and present status of the newly organized California Association of Student Councils, as well as the advantages and problems of the state wide organization, and the learning values of student participation in the scheme of free public education in a Democracy and finally, (5) to suggest courses of action with respect to student participation which might be employed by all of the high schools of the State.

The student council was defined as, "any organization of the students for the over-all administration of student affairs." This definition was offered as an inclusive one which might over-arch the more limited concepts found in such terms as student government, self government, student cabinet, and the like. The concept was broadened to include not only the activities of well organized groups, but the whole student participation movement.

Procedure

Before the study was begun, the cooperation of the California Association of Student Councils along with the California Association of Secondary Administrators was obtained, and the committee of high school principals who helped to create the state wide student council organization agreed to act as a jury of experts in the formation of the problems to be presented in a questionnaire.

Elon Earl Hildreth is president and district superintendent of the San Mateo (California) Junior College, a position to which he was appointed last spring. He had formerly served as junior high school principal, high school principal, and president of the Palomar Junior College at San Marcos, California. His Ph.D. was earned at the University of Southern California in 1950. Dr. Hildreth's article is a digest of his dissertation.

Discussion by the jury of experts developed the consensus that the type of student participation to be found in a given high school depended almost entirely upon the philosophy of the high school principal and that, as the most significant figure in the whole structure, it was he who should provide the answers to the questions propounded.

The questionnaire was submitted to all of the high school principals in California. In all, 313 principals, or 77.2 per cent of the high school principals responded. The schools ranged in size from the smallest (Death Valley with twelve students) to the largest (Bakersfield with 4,930 students). Geographically, the schools were spread rather evenly throughout the state from the Mexican border to the Oregon line. In terms of size, the most typical high school in California is between 200 and 299 in enrollment, and the median sized high school has 535 students.

Scope of Questionnaire

The questionnaire was designed to reveal: (1) the degree of faith California principals were placing in student participation, student courts, student control, etc.; (2) the scope of the movement; (3) the problems being undertaken by students; (4) what devices were employed as learning techniques in student legislation and self controls; (5) the governmental patterns existing in student organizations; (6) something of the philosophy of education of the principals themselves; (7) the role of student participation in the improvement of leadership qualities; (8) the learning values which the principals believed to be the most important in student participation.

The second phase of the study concerned the California Association of Student Councils. Here the principals were asked to react to the worthwhileness of the: (1) structure of government, (2) the philosophy implied in the organization, (3) its effectiveness as an instrument for cooperative interaction, (4) the "grants of power" entrusted to students, (5) provision for functional effectiveness, (6) officer and sponsor controls and, finally, (7) its consistency with the American theory of democratic action.

The data were treated statistically as simply as possible. Inasmuch as the opinion of the principal only was being asked, there was no need for studies of correlation. All questions were put in check form which required the response, "yes" or "no," a check mark, or an evaluation on a five point scale. Only two sets of questions called for evaluation, namely: (1) those having to do with learning values inherent in student council participation, and (2) those involving the appraisal of the "activities" usually practiced in student council organizations.

Pilot Study

As the data were being organized, a question on research procedure was raised: "Is there a consistency of practice among schools of widely differing size?" To answer the question, the schools were segregated into three groups: small schools with one to 299 students, middle-sized schools with 300 to 899 students, and large schools with 900 and more students. After comparing the responses to each fifth item in the questionnaire, it was found there was no significant difference in the responses of any of the three groups. It was decided, therefore, to treat the data as a whole. The breadth of the study was admittedly great and, because of the remarkable consistency between groups, it was believed that the "whole group" approach promised greater clarity.

Scope of the Student Council in California

It was found that the "student council" is an almost universal characteristic of the California high schools. Out of the thirty-four schools reporting, only seven indicated that they had no student council. Confidence in the California Association of Student Councils was indicated through the fact that approximately one-third of the schools, representing one-half of the total high school enrollment, had joined the C.A.S.C.

The payment of dues was still a condition of voting or running for office in more than half of the schools. This practice runs counter to the advice of the authorities in the field who point out that the "poll tax" is being abolished in America.

Voting and Membership of Faculty Members

Faculty members were permitted membership in 34 per cent of the schools, but only 21 per cent of the schools permitted the faculty to vote. The inference drawn here was that the students looked to the faculty as a source of revenue, but where not keenly interested in faculty participation in student affairs.

Organization Framework

The principal of the school retained the veto power in almost every case. Common practice required the chartering of all clubs under the jurisdiction of the council.

The governmental pattern most often followed was the commission form of the American cities. The legislative branch of government was almost invariably used, but only one-third of the schools employed the

student court. Approximately four out of five of the schools used the unicameral form of legislature. Sponsors for the student council were appointed by the principal in 277 schools and were elected by the students in only thirty-six schools.

Student Control

Approximately 85 per cent of the schools were using some form of student control system. In 115 schools, cases of infractions of the rules were referred to the student court, but in the remaining two-thirds of the schools, such cases were referred to the vice-principal, the principal or some other faculty member. Although student control was a common practice, only 43 per cent believed that it "worked."

Student Courts

Only a third of the schools used the student court, yet in the 115 schools using it, 100 per cent of the principals believed it was working well. Faculty supervision was provided to student courts in almost every case. Trial by jury was permitted in 79 per cent of the schools.

California Association of Student Councils

Although the C.A.S.C. was only four years old at the time this study was made, it had already become vigorous. One-third of the schools were members and their principals believed it to be well worth what it cost. Ninety-four per cent of the principals believed that the C.A.S.C. was making a significant contribution to statesmanship in California. Objections to the state organization centered around "costs," and disturbance of the school program "when students were kept out of school." Some of the non-participating principals voiced the fear that "students might get ideas" through participation in state wide discussions.

Student Council Finances

Student council finance was indicated as assuming major importance. One school reported a student budget of $110,000 per year. Many of the larger schools did a business of five hundred dollars per day. In most cases the handling and accounting of funds was done by students under faculty supervision. While the safeguarding of such sums was admittedly a grave responsibility, the principals indicated that they thought that this experience offered one of the finest learning experiences in the school. The general consensus was that students should be encouraged to assist in

the raising of funds as well as helping in the decisions on how the funds should be spent.

Learning Values in Student Participation

Two out of three principals believed that student participation was equal or superior to classroom teaching in the learning of leadership skills, group action techniques, democratic procedures, relationship of authority and responsibility, group loyalties, and respect for law and order. Evidence in this field was over-whelmingly convincing in favor of student participation as a most superior device for the teaching of American democracy.

Educational Values of Student Council Activities

The activities which obtained the highest degree of approval were: presentation and presiding at student body assemblies, organization of special events, administration of elections, legislative experience, planning assemblies, management of athletic affairs, interschool conferences, and school publicity. The least valuable activities indicated were those which had to do with control of behavior, policing the halls and grounds, imposing discipline and the like.

In general, such a strong case was made for the extra-curricular activities of the California high schools that the inference was induced that many of these activities might well be drawn into the regular curriculum so that all students might have the advantages which are now enjoyed only by the leaders of the schools.

Summary

This study was carried on over a period of five years. It was designed to bring light upon an important aspect of high school life. The scope of the investigation was so broad as to make it impossible to report in this brief summary. Many significant questions were raised which deserve further study. A strong case was made here for student participation as a method as well as a philosophy of education. The details of student participation are not as important as the purposes sought. Student participation, like democracy itself, is a way of life.

Self-direction, social planning, group cooperation, intercultural understandings and the like, are all parts of the conditions of social life in a democracy. It is with such that student participation succeeds so well.

Improving the Teaching of Mathematics: A Departmental Project

WILL M. FAWCETT AND OTHERS
San Francisco Unified Schools

IN RECENT years, the Evaluation Program of the San Francisco School Department, as conducted by the Bureau of Research, has shown that the mathematics department has not been keeping pace with other departments in terms of pupil progress.

A little over a year ago, one of the junior high schools decided to put forth a supreme effort to see that each pupil made a creditable amount of growth in arithmetic commensurate with his ability to learn. To achieve this end an extensive study was made of the objectives, content, and methods of presenting arithmetic in the elementary and junior high schools. As a result of the study, it was considered necessary to develop guides to aid mathematics teachers in determining their objectives ,as there was great variation in the content of the material presented by the teachers. The material used as a basis for these guides was derived from an extensive study of San Francisco's School Curriculum Bulletin No. 101, textbooks covering elementary and junior high school grades and discussion with elementary and junior high school teachers.

The guides consist of an outline of some forty-one mathematics concepts showing when they are to be introduced and the degree of competency expected in each grade with concrete examples illustrating the subject matter. As a result of the study of arithmetic test data of the pupils of the school, it was found necessary to develop guides for the fifth, sixth, seventh, and eight grade levels.

The Problem

Mathematics teachers felt that their problem was great because of the great spread of arithmetic ages in each of their classes and especially great because development in arithmetic ability depends so much on mastering all intermediate steps. A study was made of the total arithmetic ages of the

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Will M. Fawcett is principal of Horace Mann Junior High School, San Francisco Unified School District. He has been in his present position for the past 16 years. Previously he had taught and held various administrative positions in California. He has studied at Stanford University and received his Master's Degree in 1934. Mr. Fawcett's article describes a project in which a school department analyzes its shortcomings and makes an intelligent attack on the problem.

individuals in each of the classes and a regrouping was made so that there would be a more homogeneous grouping. Though the arithmetic age spread in each of the three classes tested was still three years, the classes were so grouped that each represented a different level of arithmetic achievement ability as indicated by the class median. The median arithmetic age of the three classes bore the same relative comparison to each other that the learning capacity of the groups did, as measured by their median I.Q. The grouping of the classes satisfies the desire for sufficient heterogeneity to allow for placement according to social adjustment needs, yet provides for sufficient similarity in learning capacity to make growth possible.

Approach

Each teacher was given a compilation showing the complete *California Basic Skills* test data of each of her pupils and, using the guides as an aid, she was encouraged to plan her work so that the concepts presented were suitable to the achievement level of her pupils and, therefore, meaningful to the group.

Since we are primarily concerned with social and personality integration of the pupil we are careful that pupil are not confronted with situations or problems that are beyond them or too far removed from their own world of experience or interest. As progress is made in mastery of fundamentals, teachers apply these stages of development to the solving of thought problems. They try to make these problems meaningful to the pupils. They may be within the realm of social, industrial arts, home economics, science, etc., but the degree of difficulty is kept within the mathematical limits of the pupil's ability. As an example: problems dealing with fractions may be correlated with food classes by calculating the amount of ingredients used if the recipe is cut in half, or thirds, or doubled, or tripled. Problems in addition and subtraction and multiplication of whole numbers, decimals and fractions may be correlated with Industrial Arts Department by calculating the number of board feet required for construction and the determination of relative costs when the project is made of different woods. Problems in percentage may be made more meaningful by correlating with Social Studies, by calculating percentage of growth of population of communities or by tying in with pupil's activities by solving problems dealing with percentage of games lost or won by classes, or by determining percentage of pupil's allowances saved or spent.

Use of Progress Charts

In order that all teachers may be aware of progress made in classes, a master chart was prepared which indicated at the top, all of the mathematics concepts taught throughout the eight grades, and down one side,

was listed all mathematics classes. Each teacher planned her work in advance and sent to the office weekly plans which briefly stated the concepts to be introduced or reviewed during the coming week. Included in the weekly report was a statement relative to grade level of the concept taught. The concepts to be studied by each class were recorded on the master chart which was kept posted on a bulletin board in one of the administrator's offices and was available to all teachers at all times. The color of entry indicated the grade level of concept studied — black indicated seventh grade, red — eighth grade, blue — ninth grade.

The chart enables both administrator and teachers to know what material has been presented to a class semester to semester, as the chart of the preceding semester is posted with that of the current one. The chart also reveals at what level the work is being presented. Thus a high eighth class might be receiving work on the low eighth level due to the necessity of starting from the pupil's level of ability. Since the chart reveals to all the progress made in mathematics classes, it has been a source of pride to those teachers who have been most successful and a stimulus to others to use the various devices and techniques available to make favorable comparable showings. It is quite evident that the interest and morale of the teachers have improved.

Class progress charts have been used by some of the mathematics teachers to aid the teacher in working with pupils of different grade levels within her classes. These charts furnish a quick graphic representation of the progress of the class as well as a means of stimulating the pupils' interest in improvement. Before introducing a concept, the teacher using the chart gives a "pretest" to the pupils. The pretest is a brief diagnastic test on fundamental operations in the concept being presented. All pupils passing the "pretest" with a perfect score have a red triangle placed in the lower half of the appropriate square opposite their names on the chart. These pupils who passed the "pretest" are given more advanced assignments in the concept presented while the teacher has class discussion, explanation and practice work with those who did not pass. They are then given a "retest" and upon passing, have a blue triangle marked in the upper half of the appropriate square of the chart. Those failing to pass perfectly on the first "retest" are tested again after additional assistance has been given to them. Any subsequent passing in a concept after the first "retest" is indicated by a blue triangle. By referring to the chart a teacher can tell at a glance which pupils have not mastered concepts and which need more help. This help is given either by the teacher or by the more advanced pupils.

When a concept is being taught, the entire class participates in the introduction. However, in the assignments, those pupils who have failed the pretest are assigned one-step problems to help them grasp the concept.

The pupils who have passed the test art introduced to more challenging two-step problems. A daily ten minute opening quiz on a basic concept is given to the entire class each day to serve as a review for advanced pupils and practice for slower pupils. Thus, through observation of the progress chart, assignment of problems meeting level of pupils and daily reviews, the teacher is able to help pupils progress commensurate with their ability to learn. Remedial classes have been organized so that pupils far below grade expectancy may receive additional help.

Frequent meetings were held by the mathematics teachers who shared experiences and discussed techniques for improving their methods. Among the motivating devices developed were the master and class progress charts which have been previously explained. Diagnostic tests were devised by the group as an aid to effective teaching. The teachers were able to prepare more helpful tests since they knew more definitely what it was they wanted to know about their pupils.

Results of Program

The effectiveness of this program was revealed in a series of graphs which show for each high eighth grade class a comparison between their *California Basic Skills Tests* in the high seventh grade and a year later in the high eighth grade when the test was given in December 1951. One of the most gratifying outcomes of the program is the carry-over of pupil interest in mathematics the succeeding term. Their mathematics teachers report that the pupils are taking a keen interest in their mathematics classes. The records show that the median growth in arithmetic for each class of the high eighth grade ranges from 1.2 years for the class with a median I.Q. of 85, to 1.7 years for the top class with a median I.Q. of 103. The middle class with a median I.Q. of 91 made a growth of 1.4 years. These gains are shown graphically in Chart A.

Departmental Participation

A program of this kind would be open to question if it were superimposed by the administrative staff. Since this project was the outgrowth of the interest and cooperative endeavor of a number of people, it might be of interest to know how various departments participated.

The *Guides to Arithmetic* were prepared by an assistant principal who was particularly interested in the objective. She consulted elementary and junior high school teachers and various texts and curriculum guides .

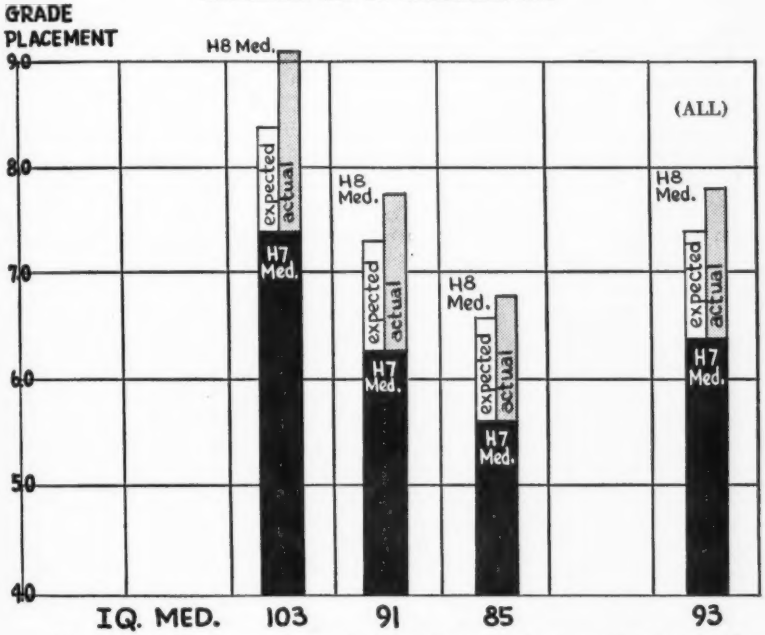
A member of the mathematics department developed the chart and collected teachers' weekly outlines, recording data on the chart for ready comparison and use.

The mathematics teachers themselves, under the leadership of a department head, devised their own classroom charts for the use of the

pupils as well as for themselves, and worked out short diagnostic tests for their classroom use in identifying individual pupil needs.

CHART A

ACTUAL GROWTH COMPARED WITH EXPECTED GROWTH IN GRADE PLACEMENT FROM HIGH SEVENTH TO HIGH EIGHTH GRADE DECEMBER 1950 TO DECEMBER 1951



The remedial program for special assistance to those pupils who could not adjust to the regular classroom procedure was under the direction of two educational counselors and the mathematics chairman.

The *California Basic Skills* and the *California Mental Maturity Tests* furnished diagnostic and evaluative instruments to be used as a means of evaluating the program. A study of this material, which is included, will give a more complete picture of the results than we have been able to describe in this article.

Implications

The results of this project has convinced us that similar progress in other fields will require an equal amount of analysis and diagnosis of content and methods and a definite system of evaluation.

Critical Appraisal of Research in State School Finance

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THERE have been a number of significant developments in the field of state school finance during recent years. Some of the most important may be summarized as follows:

1. *Measurement of Educational Need.* For a number of years the common procedure was to use average practice as a basis for developing state formulae. Some recent studies have directed attention to the inequities resulting from the use of average practice. Since average practice includes the average of good as well as bad practices, it may tend to handicap elementary schools or perpetuate small schools and districts. The more recent tendency, as indicated by the summaries of research in the forthcoming volume "Problems and Issues in Public School Finance," is to develop measures of need on the basis of studies of desirable practice. This procedure has already been used in a number of states with excellent results.

2. *Transportation.* Many states are still distributing funds for transportation on the basis of a fixed amount per pupil, a percentage of the costs, or some other similar plan. Studies in a number of the states have shown these practices to be inequitable. Evidence accumulated thus far shows rather definitely that the best single measure of transportation need is density of transported population. Corrections may need to be made for road conditions and certain other factors. This provides an objective measure that is not subject to manipulation by local school officials or the judgment of state officials. A number of the states have developed formulae based on density factors during recent years.

3. *Capital Outlay.* The School of Education at the University of California and the U. S. Office of Education have recently completed a comprehensive study published under the title, "State Provisions for Financing Public School Capital Outlay Programs." This study shows that nearly

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half of the states now have some plan for state assistance in financing capital outlay. A number of the programs, however, are emergency programs which have a number of undesirable features from a long-range point of view. An analysis of these plans shows that there is considerable danger that undesirable state controls may be developing which may tend to weaken local responsibility. Criteria for the development of a long-range program are proposed in the study.

4. *Determination of Costs.* Since educators have been chiefly responsible for studies involving state aid, there has been a tendency to develop formulae which placed considerable emphasis on cost factors. The assumption has been that a given amount of money will result in reasonably equitable educational services, and if the amount is adequate the services will be adequate. Laymen, however, do not so readily accept this point of view. During recent years more emphasis has been placed on lay participation and on the development of a program through the determination of desirable services and facilities. An objective formula for determining needs and costs can then be determined.

5. *Local Required Effort.* When foundation programs are established, some means of determining funds which should be provided locally toward the costs of the program is necessary. The most customary practice has been to use a fixed tax levy based on local assessed valuation. However, in most states assessment practices vary greatly among the counties of the state. Studies made in a number of the states show that the assessment ratio in some counties may be two or three times as high as it is in other counties. A few states have moved rather successfully toward assuring uniformity of assessment practices. Most states have found that this is not politically feasible in the near future and have moved either in the direction of determining ratios and using those ratios to determine the local funds which should be provided or developing and using an index of taxpaying ability. Several states have already incorporated one of these plans in their legislation.

6. *State Requirements or Controls.* Recent studies have shown that a number of the state aid plans are tending to result in undesirable controls, not so much because of the amount of money provided by the state as because of the manner in which the program is established or administered. Some of the undesirable controls are perpetuating undesirable practices such as uneconomical district reorganization, while others are tending to undermine local responsibility. Studies summarized in "Problems and Issues of Public School Finance" show that it is possible as well as desirable to establish foundation program plans that operate equitably and place maximum emphasis on local responsibility and initiative.

Continued on page 177

Evaluating Classes in Terms of Pupil-Teacher Ratio

A Study of Two Methods of Evaluating Classes in Terms of Their Effect on the Pupil–Teacher Ratio

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AT TIMES of limited school budgets, administrators often wonder which classes they should try to eliminate. If the decision is reached entirely on the basis of subjective evidence, there is sometimes a feeling of injustice among members of the staff. This study was made in an effort to find a mathematical, impersonal way of evaluating the various subject offerings. Some useful mathematical instruments were found. However, in a situation such as a school, that is made up primarily of *people* and their relations to one another, it is not possible to express all of the facts in terms of mathematics.

The techniques of this study may not be directly applicable to other schools, but could be adapted to them. Stockton College is a four-year junior college comprising grades 11–14 and offering both high school and college-type classes. However, for all grades, the students earn college-type units and teaching loads are assigned in terms of teaching units. Fifteen units is considered an average load of work for a student, and 16 units is an average load for a teacher.

Pupil–Teacher Ratio

Much is said about pupil–teacher ratio, and the importance of keeping the ratio large in order to run the school economically. However, the ratio seems to be rarely defined. For this study it was necessary to define it, the following formula being used:

$$\text{Pupil–teacher ratio} = \frac{\text{full-time students}}{\text{full-time staff}}$$

It is probable that such a definition is more important for Stockton College than for many schools, since it has a large number of part-time students and part-time faculty members.

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The Difference between the Two Methods of Evaluating Classes

Two mathematical formulas have been devised and will be explained in detail in later statements. However, it is well to point out that there is a basic difference in philosophy between the two methods. One method measures full-time students in terms of the units they carry, and measures a particular subject in terms of the units the students earn in the class. That is, a class such as physical education might contribute ½/15 or 1/30 of the total units the student earns. On the other hand, if the class is measured in terms of hours spent in that class, the physical education takes care of 2/23, or about 1/11 of the student's time in class per week.

The method involving teacher and student units (in many cases, the teacher is given more units for teaching the class than the student earns in taking the class) leads to a calculation of the total salary costs for a given subject or area. The method involving class hours per week for the class leads to a calculation of the ADA brought in by the class. By the use of the proper factors, one may compare the cost of the class with the earning power of the class.

The Method Based on Units

The Index Number

Let E = total enrollments in a given subject.
N = number of sections of a given subject.
S = student-units earned by a student in a class of the given subject.
T = teaching load units assigned to a teacher of a class of the given subject.

Next an arbitrary index number is set up as a measure of the subject. Large index numbers will correspond to a high pupil–teacher ratio, and small index numbers to a low pupil–teacher ratio. The index number shall be defined as follows:

$$\text{Index No.} = \frac{\text{total enrollments}}{\text{Number sections}} \times \frac{\text{student-units}}{\text{teaching-units}}$$

Analysis to show the relation of the index number to pupil–teacher ratio.

$\Sigma E \times S$ = total units earned by all students in all classes.

$\frac{\Sigma E \times S}{15}$ = total number of full-time students.*

$\Sigma N \times T$ = total units for *teaching*.

$\frac{\Sigma NT}{16}$ = full-time equivalent *teaching* staff.

* The actual average units of full-time students was calculated, and was 14.88. For ease of calculation, this was approximated as 15.

In order to convert from teaching staff only to the complete credentialed staff of the school, an appropriate factor would have to be calculated each year. For Stockton College, Spring, 1950, the factor was as follows:

$$\frac{152.0 \text{ full-time staff}}{124.04 \text{ teaching staff}} = \frac{19.60}{16}$$

Pupil–teacher ratio has been defined as:

$$\text{Pupil–teacher ratio} = \frac{\text{full-time students}}{\text{full-time staff}} = \frac{\frac{\Sigma E \times S}{15}}{\frac{19.60}{16}\left(\frac{\Sigma NT}{16}\right)}$$

$$= \frac{16 \times 16}{15 \times 19.60}\left(\frac{\Sigma ES}{\Sigma NT}\right)$$

$$= \frac{16 \times 16}{15 \times 19.60}\left(\frac{E_1 S_1 + E_2 S_2 + E_3 S_3 + \ldots.}{N_1 T_1 + N_2 T_2 + N_3 T_3 + \ldots.}\right)$$

$$= \frac{16 \times 16}{15 \times 19.60}\left(\frac{E_1 S_1}{\Sigma NT} + \frac{E_2 S_2}{\Sigma NT} + \frac{E_3 S_3}{\Sigma NT} + \ldots.\right)$$

A comparison of the *Index Number* with the *pupil–teacher ratio* in the line just above gives one meaning of the Index Number. If a given group of classes, such as 20 sections of physical education, were the *only classes* in the school, then the pupil–teacher ratio would equal:

$$\frac{16 \times 16}{15 \times 19.60} \times \text{Index Number.}$$

Conversely, if *all classes* in the school were organized in the same way as a given group (such as 20 sections of physical education) then the pupil–teacher ratio for the whole school would equal:

$$\frac{16 \times 16}{15 \times 19.60} \times \text{Index Number.}$$

Therefore, the index number is proportional to the kind of pupil–teacher ratio a given group of classes tends to produce.

A further modification of the formula for the pupil–teacher ratio shows:

$$\text{Pupil–teacher ratio} = \frac{16}{19.60} \times \frac{16}{15}\left[\frac{E_1 S_1}{\Sigma NT} + \frac{E_2 S_2}{\Sigma NT} + \frac{E_3 S_3}{\Sigma NT} + \ldots..\right]$$

$$= \frac{16}{19.60} \times \frac{16}{15}\left[\frac{N_1 T_1}{\Sigma NT}\left(\frac{E_1 S_1}{N_1 T_1}\right) + \frac{N_2 T_2}{\Sigma NT}\left(\frac{E_2 S_2}{N_2 T_2}\right) + \frac{N_3 T_3}{\Sigma NT}\left(\frac{E_3 S_3}{N_3 T_3}\right) + \cdots\right]$$

$$= \frac{16}{19.60} \times \frac{16}{15}\left[\frac{N_1 T_1}{\Sigma NT}\left(\frac{\text{Index}}{\text{No. 1}}\right) + \frac{N_2 T_2}{\Sigma NT}\left(\frac{\text{Index}}{\text{No. 2}}\right) + \frac{N_3 T_3}{\Sigma NT}\left(\frac{\text{Index}}{\text{No. 3}}\right) + \cdots\right]$$

Therefore, $\frac{N_1 T_1}{\Sigma NT}$ is the proper weighting factor to use in order to combine index numbers to give the complete pupil–teacher ratio. By use of this factor it is possible to compute the per cent of the whole pupil–teacher ratio that is contributed by a given group of classes. However, the per cents are so small that this does not seem to be a very useful piece of information.

Table I gives information in regard to Stockton College classes as of Spring, 1950. It will be noted that the pupil–teacher ratio a subject area tends to produce *often differs greatly from the average class size.*

TABLE I

Pupil–Teacher Ratios At Stockton College

SUBJECT AREA	Index Number	Average Class Size	Pupil-Teacher Ratio
Economics 40	24.9	62.3	21.9
Social Science 40	39.3	39.3	34.5
Political Science 30	39.8	39.8	35.0
English 1a	32.8	32.8	28.8
English 71	14.9	14.9	13.1
Physical Education 13th and 14th (Only S.C. ½ unit classes)	16.5	34.9	14.5
Hygiene 1	36.0	36.0	31.7
Physical Education 11a–b	36.4	49.2	32.1
Physical Education 12a–b	37.0	39.4	32.6
Basic A and B	27.9	33.6	24.5
Basic C and D	33.5	33.5	29.5
College and Life	29.5	29.5	26.0
Industrial Arts Shops (5 or 6 hours per week)	20.0	20.0	17.6
Industrial Arts Shops (4 hours per week)	18.8	18.8	16.6
Humanities 1	14.8	44.6	13.0
Humanities 2	14.8	44.6	13.0
Humanities 3	19.8	39.6	17.4
Humanities 10	16.0	32.0	14.1
Humanities 40b	20.0	20.0	17.6
Languages A, B, C	21.8	23.2	19.2
Languages 1, 2, 3, 4 (not counting those with reduced teaching load)	27.3	27.3	24.2
Anatomy 1	16.3	21.7	14.4
Physics 2b	8.8	11.0	7.7
Physics Aa–b	20.4	21.7	17.9
Physical Science Aa–b	29.8	30.8	26.2
Geology Lecture 1a and 1b	45.0	52.5	39.6
Geology Laboratory 1a and 1b	13.5	27.0	11.9
Chemistry Lecture 1a and 1b	34.3	34.3	30.2
Chemistry Laboratory 1a and 1b	10.3	20.6	9.1
Chemistry Aa and b	23.0	24.6	20.2
Business 96a	20.5	32.1	18.1
Business 94a	32.8	30.0	28.9
Business 70a–b	27.5	30.4	24.2

The Method Based on Hours

This method differs from the previous one only in the way that the number of full-time students is defined and calculated. However, it leads to a *notably different pupil–teacher ratio* in some areas and to the amount of ADA brought in by a given area.

The same definition of pupil–teacher ratio is used as before, namely:

$$\text{Pupil–teacher ratio} = \frac{\text{full-time students}}{\text{full-time staff}}$$

Computation of full-time staff.

Let N = number of sections of the given subject

T = teaching-load units assigned to a teacher of a class of the given subject

ΣNT = total units for *teaching* a given subject or area

$\frac{\Sigma NT}{16}$ = full-time equivalent *teaching* staff

$\frac{19.60}{16} \times \frac{\Sigma NT}{16}$ = full-time *total* staff (using the ratio correct for Spring, 1950)

Computation of full-time students.

Let E = total enrollments in a given subject.

S = class-hours per week for the class.

ΣES = total student-hours per week earned by all students in the given subject.

$$\frac{\Sigma ES}{\text{Average class-hours per week}} = \text{number of full-time students.}$$

In the above formula, the most appropriate value for average class-hours per week should be used. For Spring, 1950, the values were as follows:

22.59 average hours per week of full-time 13th and 14th year students.
29.97 average hours per week of full-time 11th and 12th year students.
26.43 *weighted* average hours per week of all students — grades 11 through 14.

The formula. By an analysis similar to the one for the method based on units it can be shown that the pupil–teacher ratio that a given class or subject area *tends to produce* is given by the following formula:

$$\text{Pupil–teacher ratio for a given class or area} = \frac{\Sigma ES}{\text{average class hours per week}} = \frac{\Sigma ES}{\frac{19.60}{16} \times \frac{\Sigma NT}{16}}$$

$$= \frac{16}{19.6} \times \frac{16}{\text{av. class hrs./wk.}} \times \frac{ES}{NT} = \frac{13.06}{\text{av. class hrs./wk.}} \times \frac{\text{student-hours}}{\text{teacher-units}}$$

Assumptions and Data

1. On the 13th and 14th year level, each 525 student hours = 1 ADA.
2. On the 11th and 12th year level, each student in attendance every day for 1 year = 1 ADA.
3. In 1948–49 each 13th and 14th ADA brought in $168.00.
4. In 1948–49 each 11th and 12th ADA brought in $123.80.
5. Salaries of certificated personnel in Stockton College for 1949–50:

$$\frac{\$773{,}000}{175} = \$4417.00 \text{ average salary per year.}$$

6. Spring semester, 1950:

full-time equivalent teachers = 123.74
full-time equivalent counseling, administrative, etc. = 27.52
151.26

$$\text{Ratio: } \frac{\text{teaching staff only}}{\text{all staff}} = \frac{123.74}{151.26} = \frac{16}{19.6}$$

7. For Stockton Unified School District, year of 1948–49, returns from ADA represented 47.3 per cent of total income of district.
8. For Stockton Unified School District, year of 1948–49, payments for salaries of certificated personnel represented 62.51 per cent of the total expenditures of the district.

Examples

The preceding facts make it possible to estimate the cost of a class, or subject area, and the income from ADA. The estimates are rough, since some of the facts are not directly applicable. In a unified district it is not always possible to get data relating to a particular segment of the system. However, two examples follow:

PHYSICAL EDUCATION 13 AND 14

107.04 teacher units
6372 student hours per week

COST:

$$\text{Full-time teaching staff} = \frac{107.04}{16} = 6.67$$

$$\text{Full-time staff including administrators} = \frac{19.6}{16} \times \frac{107.04}{16} = 8.2$$

$$\text{Salaries (per semester)} \frac{19.6}{16} \times \frac{107.04}{16} \times 2207 = \$18{,}000$$

$$\text{Total cost} = \frac{18{,}000}{62.51\%} = \$28{,}800$$

INCOME:

$$\frac{6372 \times 17}{525} = 263.0 \text{ ADA}$$

$$\text{Revenue from ADA} = 263.00 \times 168 = \$34{,}600.$$

SCIENCE DIVISION, 13 AND 14

174 teacher-units
5656 student-hours per week

COST:

$$\text{Full-time teaching staff} = \frac{174}{16} = 10.85$$

$$\text{Full-time staff, including administrators} = \frac{19.6}{16} \times \frac{174}{16} = 13.3$$

$$\text{Salaries (per semester)} \frac{19.6}{16} \times \frac{174}{16} \times 2207 = \$29{,}300$$

$$\text{Total cost} = \frac{29{,}300}{62.51\%} = \$46{,}750$$

INCOME:

$$\frac{5656 \times 17}{525} = 182.8 \text{ ADA}$$

$$\text{Revenue from ADA} = 182.8 \times 168 = \$30{,}700$$

Comparison of Pupil–Teacher Ratio Calculated by the Two Methods

In the formula for the pupil–teacher ratio a given subject tends to produce, the calculation based on *student-units* more nearly evaluates the subject in terms of the part it contributes to the total *educational* program

TABLE II

Comparative Data for Computing Pupil–Teacher Ratio

ALL CLASSES	Average Class Size 30.54	Pupil-Teacher Ratio, Units 20.39	Pupil-Teacher Ratio, Hours 19.96
Science 13th and 14th	24.0	15.9	18.8
Science 11th and 12th	25.7	22.2	18.5
Home Economics 13th and 14th	17.6	12.8	12.34
Social Science 13th and 14th	41.3	34.8	26.9
Basic A and B	33.6	24.4	24.3
Basic C and D	33.6	29.2	24.2
College and Life	29.5	25.9	17.4
Physical Education 13th and 14 and Sports	33.4	11.3	34.4
Hygiene 13th and 14th	36.6	31.8	21.2
Physical Education 11th and 12th, Sports and Hygiene	41.6	26.2	29.7
English 13th and 14th; 1a–b, 40b, 46b, Journalism	27.5	30.5	19.95
English Laboratory 13th and 14th; 71, 73, 74	17.0	14.04	15.75
English 11th and 12th, and Journalism, Drama, Speech	21.77	18.8	13.85
Speech 13th and 14th; 1a–b, 16, 17, 72	22.6	21.3	14.15
Humanities 13th and 14th (1 to 40b)	39.6	16.5	19.6
Music 13th and 14th	26.3	16.04	20.6
Music 11th and 12th	24.4	19.9	18.4

of the student. That is, the physical education course for ½ unit is 1/30 of the total educational experience of the student. On the other hand, the calculation based on student-hours evaluates the subject in terms of the portion of the total student hours in class is devoted to the given subject. Thus, the physical education course for 2 hours per week takes care of 1/11 of the total time the student spends in class. The question remains — Is the unit-value or the time spent in class the better measure of the worth of the class? Table II gives the numbers for comparison.

Conclusions

More valid comparisons can be made in regard to pupil–teacher ratios in general if a more carefully defined measure is used. This is particularly true on the secondary level where a variety of class organiaztions may exist. If an accurately defined pupil–teacher ratio is to be considered, then the measures suggested in this study may be used to judge the effect of the different subject areas. The index number is not difficult to compute if plans are made ahead of time and the necessary data are collected. An administrator may wish to give a particular subject a place in the curriculum in spite of its undesirable effect on the pupil–teacher ratio, but the judgment may be made more clearly if the exact facts are known.

Evidence of unprecedented growth of citizen interest and participation in the public schools of the nation is presented in a comprehensive national round-up of facts on the expanding citizen movement by **The School Executive** in its January 1952 issue. The product of a year of intensive study and effort by the staffs of the National Citizens Commission for the Public Schools and **The School Executive**, the detailed report covers the work of 1,500 local citizens groups in all regions of the United States.

Describing the work of scores of citizens groups in communities of all sizes throughout the country, the survey shows how these committees range in activity from bond issues to curriculum, from school lunches to bus transportation. In a map showing the location of citizens committees, New York State leads the nation with more than 150 at work. Only one state, Wyoming, is reported to be without a citizens school committee. Three states (Michigan, California, Ohio) have between 100 and 149 citizens committees in operation. At the lower end of the ladder are nine states with only one to nine such groups: Nebraska, North and South Dakota, Montana, Idaho, Nevada, Utah, Arizona, and New Mexico. Sixteen states have organized state-wide citizens committees.

Educational Achievement as a Variable In Psychological Research

LOUIS S. LEVINE
San Francisco State College

THE social scientist, regardless of professional identification, selects the variables to be described, manipulated, controlled, or predicted in his study of human behavior. The purpose of the research and its setting, as well as the theoretical framework in which the investigator operates, will also be involved in his choice of appropriate research variables. Generally, the attempt is made to utilize research variables having greatest relevance, descriptive value and specifiability.

The psychologist studying the dynamics of human behavior frequently has difficulty in determining which variables are most relevant, descriptive, or specifiable. Practical considerations, as well as the complications arising from the multivariate nature of the issues with which he is concerned, contribute to this problem of selection.

It is the point of the present paper to suggest that the concept of educational achievement may be relevant as a variable in certain types of psychological research, and to offer two examples which support this contention.

The psychologist conducting research in a clinical setting frequently attempts to relate certain measurable variables expressed in terms of test scores to particular behavioral states. These behavioral states or conditions are frequently subsumed under certain diagnostic categories. In such research, differences in the dynamics of behavior and personality structure may be inferred on the basis of differential test performance of diagnostic groups. In this type of research schema inferences may also be drawn relative to the etiology and course of the different pathological conditions.

Recent research (3, 4) conducted by the writer in a clinical setting*

* These studies were carried out at the Veterans Administration Hospital, Palo Alto, California.

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points up the relevance of educational achievement as a variable in this type of psychological research. When expressed as attained grade level, this variable may be considered a rough index of composite intellectual, emotional, social, and cultural development. Considered as a composite measurement, its relevance to research directed toward the differentiation of diagnostic groups should be apparent. The following examples illustrate the point.

In the first example to be cited, two groups of hospitalized neuropsychiatric patients, comparable with respect to diagnosis, sex, racial origin, and their exposure to standardized psychological testing, were studied. (4) As a part of the testing routine, the patients comprising these two samples were administered the Wechsler–Bellevue test of adult intelligence, Form I. The overall group profiles were then tested for the existence of differential patterns via a special analysis of variance technique. (1) The results indicated that the profiles for these two groups of schizophrenic patients differed significantly. The hypothesis was advanced that the mean educational level of the second group, which was over a full grade higher than the first, was responsible for the obtained differences.

This discrepancy in educational attainment is relevant to the interpretation of the data, if it can be related to the differences in these group patterns.

Garfield (2) has noted that for schizophrenic patients the relationship between performance on the W–B subtests and number of years of schooling varies for the eleven subtests. It is, therefore, of interest to consider the subtests which contribute to the differences between the two patterns.

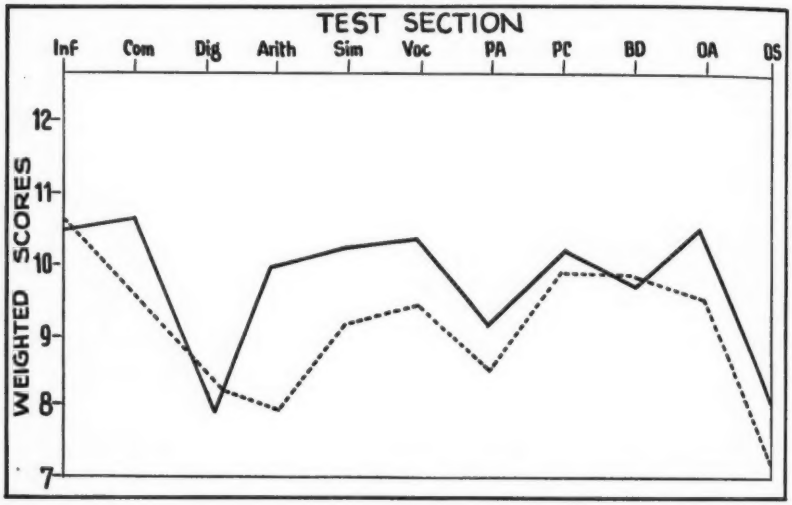
From Figure I, it is clear that the outstanding difference in the two schizophrenic patterns is the differential performance of the groups on the arithmetic subtest. The magnitude of the difference between the groups on this subtest is such that, holding all other factors equal, it could account for the finding of significant differences between the two patterns. The question, therefore, follows: To what extent is performance on the arithmetic subtest related to educational attainment? Garfield's research provides the answer to this question. He found that, of the eleven W–B subtests, the relationship between education and test performance was greatest for the arithmetic subtest. It is therefore concluded that the significant differences between the patterns of the two comparable schizophrenic samples are most likely attributable to the differences between groups in education attainment.

The research schema involving the comparison of different diagnostic groups, with respect to their patterns of intellectual performance, is a common one; therefore, the present findings, based on the performance of comparable diagnostic groups, are of considerable interest.

The second example reflects the variety of theoretical issues which may follow from a careful consideration of the concept "educational

FIGURE I

GROUP WECHSLER-BELLEVUE PATTERNS OF SCHIZOPHRENIC PATIENTS
(Samples I and II)



level" when it is considered relative to the classical variable of psychiatric diagnosis.

As part of a research investigation (3) designed to evaluate the efficiency of a procedure purported to be useful in the diagnosis of schizophrenia, a representative sample of newly hospitalized neuro-psychiatric patients, all veterans of World War II, were studied. Essentially, this sample consisted of two groups of patients categorized on the basis of thier final hospital diagnosis as psychotic and non-psychotic. The mean educational achievement expressed in terms of grade completed was 10.5 for the 54 patients classified as psychotic, and 10.8 for the 53 non-psychotic patients. The differences between these means was not statistically significant.

Since 46 of the 54 patients classified as psychotic were diagnosed schizophrenic, a number of questions of a theoretical nature could be raised. For example, is the functional efficiency of the schizophrenic individual affected during his school years? Or, is it possible that the disabling effects of schizophrenia, although present, do not jeopardize the individual's school progress? If this is so, then progress in the school, as indicated by school promotion, would be contingent upon factors other than those impaired by the schizophrenic process.

This then leads to a further line of questioning, namely, since schizo-

phrenia is clinically observed as a disturbance in which the indivdual is socally disarticulated, then why was this disturbance not manifest in relative retardation? One possibility could present itself: that the individual who is withdrawn, retiring, or occupied with fantasy may present a sufficiently docile, compliant, unobtrusive personna so as to avoid teacher or counselor attention while, at the same time, complying minimally or, perhaps, even being adequate, intellectually.

Further possibility might be that those cases which were evident during this school period in which retardation would occur were screened out for neuro-psychiatric reasons prior to induction into the service. If this were the case, then, perhaps, certain support is provided for the contention that schizophrenic patients are most aptly classified as either of the reactive or process type, rather than itno the traditional diagnostic categories.

These various questions are offered merely to suggest the lines of investigation which could fruitfully follow from a careful consideration of the finding that, for this sample, contrary to clinical expectation, the educational level of psychotic and non-psychotic groups did not differ significantly.

In summary, two examples have been offered to suggest that, in certain types of psychological research, particularly those of a clinical character concerned with intellectual, conceptual, or perceptual processes, educational achievement is a relevant variable.

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Critical Appraisal of Research in State School Finance

Continued from page 165

7. *District Reorganization.* Most states have been interested during recent years in encouraging district reorganization. However, an analysis of the finance provisions shows that a number of the states have policies and practices that actually reward small districts and tend to make reorganization difficult if not impossible in many areas. The study of the Phi Delta Kappa Commission on School Support, reported in the September, 1951 issue of *The Phi Delta Kappan*, directs attention to some of these practices and indicates some steps that may be taken toward eliminating those which tend to retard district reorganization.

DIGESTS OF PAPERS PRESENTED AT THE 1952 ANNUAL CONFERENCE OF THE CALIFORNIA EDUCATIONAL RESEARCH ASSOCIATION

San Francisco State College, March 28, 1952

(The following digests of papers were submitted by the speakers for publication in this magazine. The publication of the Conference digests is a regular feature of the *Journal* and is included to keep our readers informed regarding research efforts in California. Not all papers are included in these digests, since some of the reports will appear in full-length articles in the *Journal.* — Ed.)

General Elementary Credential Requirements in California State Colleges — Harris H. Brock, San Jose State College

It was the purpose of the study to compare the general elementary credential requirement among California State Colleges accredited by the California State Board of Education. An analysis was presented of admission requirements, classification of students, matriculation tests, admission to the professional program, preparation in the fundamentals, evaluation of candidates for the professional program, course sequence, majors, minors, electives, and subject-matter requirements in the professional program. Completed as a Master's Thesis in 1950 at San Jose College, the study is of interest and value to teacher education institutions.

Organization and Operation of Supervision of Physical Education for Boys in Larger Secondary School Systems in California — Franklin A. Lindeburg, University of California, Berkeley

The study attempts to determine the facts with regard to existing opinions and practices in the organization and operation of supervision of physical education for boys in secondary school systems in larger cities in California.

Data were collected by questionnaire, inquiries sent to experts (physical education and educational leaders in California), supervisors of physical education, boys' physical education teachers, and principals. Additional information was obtained by interviews with supervisors of physical education.

Conclusions were concerned with principles of supervision of physical education; extent of supervision of physical education; value and extent of duties and responsibilities of the supervisor; types of school organization with accompanying organization charts; operation of programs of supervision of physical education; and value and use of methods of supervision of physical education. Methods as well as duties and responsibilities of supervision of physical education were presented in some detail.

Certain definite criteria were indicated for the most effective organization and operation of a program of supervision of physical education in a large city school system.

A Study of California Interdistrict Agreement School Law in Calaveras, Merced, and Solano Counties — Harold Youngblood, Vaca Valley Union High School

This is a study of the administration of the statutory provisions in California which allow pupils resident in one school district to attend school in another. The 80 school districts in the study were allocated $3,583,666.82 from the State School Fund for the year 1950–51. Of this total, $97,186.78 was due to the interdistrict attendance of 626 pupils. Twenty poor, over-crowded, understaffed districts accepted pupils under interdistrict attendance agreements. Two small districts escaped suspension by refusing to grant interdistrict attendance agreements to seven resident pupils. The study concluded that: (1) financial dislocations were caused by the interdistrict attendance of school pupils; and (2) the interdistrict attendance law is a product of the district system and, as such, has not been able to solve the complex problems brought about by increased educational needs. The study was completed as a Master's Thesis at the College of the Pacific in 1951.

The Status and Functions of the District Superintendents of Elementary Schools in California — James R. Cowan, Arcade School District

This investigation developed information concerning training, general education, experience and certification along with legal status and duties of the elementary district superintendents of California. Pertinent areas in the scope of administration and supervision were also developed along with the determining of sources of authority.

Principal conclusions show that the position is firmly established as an educational administrative office in California; that elementary district superintendents are long term professional educators in positions generally requiring year-long attention. The position is non-teaching but large numbers of elementary superintendents are also principals. Administrative duies require large amounts of time each week in all sizes of districts. Supervision is often neglected. Elementary superintendents do the actual work in most jobs connected with their position and report they exercise widespread initiative and assume authority for numerous major job areas. The school housing problem is extensive in the districts.

A Status Study of School Building Costs in California Under the 1947 State Aid Program—M. S. Olson, Thomas Downey High School, Modesto

In this study an attempt is made to show the reason for state aid to local districts because of population increase, replacement of inadequate structures, and general economic conditions. It shows the development of state aid programs throughout the nation.

All projects built under this program were tabulated to show time of construction, type of construction, distribution of footage, and cost per square foot. Comparisons are made between state-aided projects and projects built independently by school districts. This study also includes a yardstick for measuring school costs and facilities. A report of the frequency of the various features of school construction is given. A breakdown of costs is suggested to assist in the analysis of construction cost. The location and time of construction has been reviewed so that it is applicable to all parts of the state. General construction cost tables were included for comparison with school construction costs.

It is hoped that this study will be helpful to persons responsible for planning new constructions.

Periodical Usage in the California State College Libraries, 1950–51 — Joel A. Burkman, California State Department of Education

In preparing the annual budgets for the California state colleges, questions arise concerning: (1) what periodicals shall be selected for use by a state college library, and (2) what periodicals shall be retained for permanent use and how shall such periodicals be stored.

The committee recognized that practical answers to the questions would involve study of the extent to which and the length of time during which periodicals are used.

The committee recommended that periodicals be selected by each college in terms of the following principles:

A. Periodicals should be selected to meet the curricular needs of each institution and to provide for general reading. It must be assumed that the present curriculums of the colleges will be continued with possible shifts in emphasis. To measure the probable effects of shifts in emphasis, each college should attempt to breakdown its study of periodical usage and the percentage of usage by undergraduate students on the one hand and of graduate students on the other. It is reasonable to anticipate that the enrollment in the graduate program will increase more rapidly than will the enrollment in the undegraduate program.

B. The choice of periodicals should be left to the local college provided that the number of periodicals shall be limited to a monetary allocation based on practice in comparable institutions.

C. Since the curriculum patterns vary among the colleges, it is not feasible to establish a standard list designed to meet the needs of all of the colleges.

D. The following criteria should be used in selecting periodicals:

1. Judgment of teachers and librarians.
2. Inclusion of periodicals in standard periodical indexes. This is not necessarily a limiting criterion.
3. Pooled judgment of experts as expressed in lists published by accrediting agencies and other recognized organizations.
4. Items of indispensable local interest; e.g., local newspaper.

An Evaluation of Certain Phases of Driver Education in Selected Public High Schools of California — John S. Urlaub, Berkeley High School

Since the teaching of driver education (classroom phase only) was made mandatory in all public high schools of California, this study is in effect a survey and evaluation of the present program. The following specific elements comprise the study:

1. To determine the manner and extent to which driver education is being offered.
2. To ascertain to what extent the schools of the state are fulfilling the requirements of the law.
3. To evaluate the California program as it now exists in terms of recognized standards.

The questionnaire was the basic instrument used to obtain the necessary information from 167 selected schools.

For purposes of evaluation, a list of specific criteria was established. The criteria were submitted to a group of recognized national authorities for validation.

By a comparison of existing methods in the California schools with suggested desirable standards, it was possible to make certain positive recommendations for improvement of the driver education program.

Assessment of Good and Poor Judges of Personality — Victor B. Cline, University of California, Berkeley.

College students, psychologists, clinical trainees, psychiatrists, physical scientists, and a "non-college population" were shown sound motion pictures of four or more subjects in a "stress employment interview." Each "interview" had previously been recorded with hidden movie camera and microphone. After viewing each film they (the "judges") were required to make a variety of predictions and evaluations about the personality and everyday behavior of the subjects. These predictions were checked against objective criteria. Those in the upper and lower quartiles in judging ability were assessed along a number of personality dimensions (intelligence, 12 *Minnesota Multiphasic Personality Inventory* variables, aesthetic preferences, etc.) and the personality correlates of the good and poor judges of others were sought. Implications for teachers, employers, interviewers, judges, psychiatrists, principals, etc. who constantly evaluate and judge others were discussed.

Increased Reliabilities Resulting from Certain Modifications of the Kwalwasser–Dykema Tests of Musical Aptitudes — J. A. Holmes, University of California, Berkeley

Six investigations found K–D subtests to be highly unreliable. They continue to be used in research and counseling because they are more "lively" and "musical" than many others designed for the same purpose.

Purpose of study was to raise the reliabilities of the K–D subtests without increasing the actual number of items in the test and without doing violence to the musical arrangement of the tests themselves. Two hypotheses were set up: (1) systematic changes in the Administrative Directions and Scoring Keys of the K–D tests will result in raising the reliabilities of the subscales and total test; (2) this can be accomplished without changing the actual musical stimuli of the original scales, and therefore increased reliabilities may be expressed as a function of Remmer's *et al.* application of the Spearman–Brown Prophecy Formula.

The population sampled (237 high school students) were tested for homogeneity in regard to sex and age.

About three fourths of the reliability r's obtained by the six specific studies in the first eight subtests of the K–D scales are below .45; whereas, seven eights of the reliability r's of the new K–D–H subtests are .50 or above. By weighting the Z-scores from the r's obtained by previous investigators, "standard reliability coefficients" were set up. The new r's were compared. Significant differences were established. Hull's Efficiency Formula was applied to the "standard r's" and the new K–D–H reliability coefficients so that per cent improvement in efficiency could be ascertained. The comparative data was fitted to Remmer's *et al.* application of the Spearman–Brown Formula for prophesying increased reliability from increased choices in a multiple choice item test.

Summary and conclusions were: (1) Major hypothesis substantiated. Administrative and scoring key changes in K–D test substantially raised the reliabilities of the subscales. (2) The reliabilities of the new K–D–H subtests are as follows: Tonal Memory .73, Quality Discrimination .70, Intensity Discrimination .79, Tonal Movement .88, Time Discrimination .50, Rhythm Discrimination .71, Pitch Discrimination .72, and Melodic Taste .43. (3) Total K–D–H test reliability is .91. (4) Evidence supporting minor hypothesis was inconclusive. (5) Within limits investigated, data support literature in not finding age or sex significantly related to K–D–H subtest scores. (6) *New norms* were developed for the K–D–H tests.

Some Factors Relating to Social Acceptance in Eighth-grade Classrooms — Edward A. Taylor, Alameda County Schools

Interrelationships were investigated between sex, age, intelligence and social acceptance of 1,177 eighth graders in "traditional" and "progressive" classrooms as well as unselected groups. Correlations obtained were: significantly positive between social acceptance and mental age; significantly negative between acceptance and chronological age; and zero between acceptance and mental bias and unevenness of mental profile. All significant correlations were lower in "progressive" classrooms. This was interpreted as being due to the good mental hygiene climate in these rooms. In the absence of teacher intervention a youngster's social acceptance is as constant as his I.Q. Chronological age promotion for the gifted is questioned as being optimum social promotion.

The Dependence Scale Scores of Graduate Students Classified By Major Subjects — Leslie Navran, San Francisco State College

The construction of a Dependence Scale for the MMPI by a rational method is described. Initial results are also reported. One hundred male neuropsychiatric patients scored significantly higher (i.e., expressed more dependence) than 200 Minnesota normal representing the general population. The latter group scored significantly higher than 265 male Stanford graduate students. The least dependent group of students (29 teachers) scored significantly lower than each of the other majors represented. The teachers' homogeneity indicated that disavowal of dependence is a distinctive characteristic. More research is needed. The scale may have guidance and counseling value if used to screen university students.

Generality in the Prediction of Self-Reports — John J. Wittich, College of the Pacific

The prediction of self-reports involves a situation wherein an individual is asked to respond to the items of a personality inventory as he feels that another individual would respond. To find the number of "hits" the predictions can be compared, item by item, to the actual responses that were made. Two groups of subjects were employed: college students who predicted two others, and airmen of the USAF who predicted six others. Conclusions are drawn that there is sufficient evidence for generality in the ability to predict and also in the capacity to be predicted. Hypotheses are also offered relative to the relationship of adjustment to these traits.

Consistency in Word-Analysis Techniques among Deprived Children — Albert R. Lepore, San Francisco State College

Forty-one boys and 37 girls ages 7–10 to 12–0 from a depressed area were given selected diagnostic reading tests to determine the consistency of word attack techniques as test materials varied from oral paragraphs to isolated words to word parts. Test intercorrelations indicate that skills purportedly measured by the tests are related; correlational differences suggest that certain tests provide information not given by on oral paragraph test; full use of test results is gained only by qualitative analysis; better readers tend to employ appropriate techniques as materials alter in type, while poor readers resort to low order analysis, context clues or no response.

Fiscal Support of the County School Service Program in California — Dwight E. Twist, Assistant Superintendent, San Joaquin County Schools

The purpose of this study was to determine the most defensible method of apportioning state funds to counties for the fiscal support of the county school service program in California.

Recognized principles of school finance and budgetary procedures were identified and their acceptability determined. Criteria based upon these principles and procedures were used as measures for evaluating present practices. Existing strengths and weaknesses were thus identified. The program of educational services was then redefined in accordance with the opinions of school administrators and a finance plan proposed.

Most important findings are these: (1) The general principles of school finance recommended by authorities are overwhelmingly accepted by the educators of California. (2) The present method of finance is sound in many respects, yet many weaknesses exist which need to be corrected. (3) The county school service program is interrelated with other phases of the educational program and cannot be divorced therefrom when developing or revising a finance plan. (4) Certain services such as film library services, psychological services, teacher education, health services and research services can be provided without assistance only by the larger districts. There are even more services which cannot be provided satisfactorily by the smallest districts.

The finance plan designed to apply these findings includes the following steps: (1) Definition of the foundation program including services to be provided at the county level. (2) Translation of the foundation program into cost per pupil or classroom unit considering each of four groups of services. (3) Classification of districts in accordance with district's ability to provide one or more groups of services without assistance. (4) Adjustment of costs for small and sparsely populated districts. (5) Determination of the district's ability to help support its own program. (6) Apportionment of state funds directly to the agency responsible for providing each group of services. In most cases, this agency would be the school district but, where the service cannot be provided effectively or economically by the district, the responsibility would be assigned to the office of the county superintendent of schools.

Greatest strengths of the plan are: equalization of educational opportunity, local control, control of educational agencies, encouragement of sound district organization, and objectivity of method of apportionment.

A Study of the Relationship Between Education and Duration of Marriages Which Terminate in Divorce — Duncan V. Gillies, San Francisco State College

The purpose of this research was to study the relationship between education and duration of divorced marriages. Education was hypothesized as being positively associated with duration of marriage since it was regarded as an index of group membership and that the better educated would be members of those groups most subject to community norms and expectations.

Analysis of 3,150 divorced marriages indicated the necessity of rejecting the hypothesis since it was found that whether education of husband, wife, or both combined was considered, the chances of achieving "long" marriage (10 years and over) are significantly greater for those at the extremes of the educational continuum than for those falling in the intermediate educational groups.

The Effects of a Play for Children Upon the Child Audience — Mrs. Burdette Fitzgerald, San Francisco State College

A report on restlessness, laughter, fear and excitement reactions of four child audiences in relation to the situations contained in a play written for children. Objective measures were used by trained observers to give suggestions to playwright, producer, director and actors.

Improvement in Standardized Tests — Wilbur E. Moser, Pittsburg Public Schools

This paper summarizes the statements from twelve test publishing houses concerning the improvements made in standardized tests in recent years. These improvements may be outlined as follows:

1. Test construction with emphasis on intensive curriculum and course of study analysis.
2. Greater representativeness of normative groups.
3. Greater degree of coordination of tests over a span of years on area to be tested.
4. Development and improvement of tests in the more difficult areas such as general education, personality, etc.
5. Improved aids to teachers in the use and evaluation of test results.

In all reports from editors of test publishing houses there was a more critical and modest atttiude toward test improvements than was manifest several years ago.

The Development of a Test of Auding Ability and Study of Factors Related to the Ability — John Caffrey, Sequoia Union High School, Redwood City

Preliminary results of a series of listening or auding tests administered to over 1,000 high school students, with analysis of some factors related to auding ability.

The Psychological World of the Adolescent — Daniel L. Adler, San Francisco State College

The thesis presented in this paper is that the phenomenon referred to as adolescence cannot be fruitfully explored or explained by reference either to the behaviors characteristic of certain age groups or the physiological factors associated with pubescence. By arbitrarily restricting the study to individuals "selected" according to the above mentioned criteria, one may actually be pre-defining and/or pre-determining the characteristics of "adolescence." In so proceeding, one may define "adolescence" when no such thing exists, or by-pass those defining characteristics which lie beyond the limit set by these criteria. In order to avoid these pitfalls it is suggested that an entirely different frame of reference be uesd as a basis for determining the existence of adolescence as a developmental transitional state.

If within any culture or subculture, the individuals show consistent ideas of the world in which they live different from their perceptions prior to and subsequent to this transitional one, we may be justified in referring to this particular phase as an *adolescent* one. Theoretically, within different subcultures there could be differential perceptions of the psychological world which would define "adolescence" in that culture. There is empirical evidence that this theoretical assumption is justified.

Experiments in Education: A New Pattern and Frequencies of Types — J. R. Shannon, Sacramento State College

William A. McCall's *How To Experiment In Education* (Macmillan, 1923) categorized experiments into three types. Later writers accepted the McCall pattern without question. But the 1923 pattern does not fit the cloth. In fact, it seems to have been an armchair job.

The pattern presented herewith was made from a survey of 600 published reports of experiments. The pattern was made to fit the cloth, and not, Procrustes like, making the cloth fit the pattern. The new pattern consists of 17 possible types of experiments, 13 of which were found to exist with varying frequencies among 600 examples. The survey is being extended to cover 1,000 examples.

Effect of Sustained Testing on Simple Recall — James M. Bradfield, Sacramento State College

Purpose — Specific: The effect, if any, which the strain of an eight-hour sustained testing program may have on ability to recall geometric figures; Several: Effect, if any, of the sustained duration of a testing program on the student's performance on the tests.

Procedure: (1) Placards shown to examinees at beginning and end for reproduction of figures. (2) Ten-second exposure, one minute for reproduction. (3) Second placard same figure but different arrangement.

Preliminary Analysis: (1) Gain in regard to figure recall (practice effect). (2) No difference in position recall. (3) Increase in size and loss of precision in reproductions from first to second trials.

Relationship of Personality Inventories To Student Teaching — J. U. Michaelis, University of California, Berkeley

A study of the relationships of personality characteristics to student teaching is now in progress at the University of California, Berkeley. Five different inventories involving thirty-three different sub-tests are being employed.

A first step in the study was the determination of the reliability of each subtest. Reliabilities varied from .47 to .95. Thirteen sub-tests were found to be too low in reliability to be of value in the study.

The next steps in the study are to determine correlations between individual sub-tests and combinations of sub-tests with supervisor's ratings of student teachers. A follow-up study to determine correlation with success in service is also planned.

The Development and Validation of a Preliminary Form of a Study — Habits Inventory — William B. Michael, The Rand Corporation

Designed for college students and for college preparatory high school pupils, a study-habits inventory was constructed for two purposes: (1) to make a unique contribution to the prediction of scholastic achievement, and (2) to serve a clinical function through furnishing information regarding the effectivenes of activities of an individual associated with his studying. In the development of a scoring key a partial correlation technique was employed to determine the net degree of correlation, or validity, of each item with respect to a criterion measure of scholastic achievement after the effects of scholastic aptitude were removed. In a cross-validation study it was found that performance on the inventory correlated significantly with scholastic marks and virtually zero with scores in the test of verbal intelligence employed.

Book Reviews

They Went To College

Ernest Havemann and Patricia Salter West. New York: Harcourt, Brace and Co., 1952, 277 pages.

Based on an extensive survey conducted by *Time* magazine, whose audience is largely composed of people who attended college, this book disproves the current belief that research makes for dull reading. The book, the first complete study of college graduates, covers the opinions, politics, religious activities, marriages, and many other facets of the lives of the graduates of 1,037 American colleges and universities. It has the fascination, in its clever presentation, of a murder-mystery story; at the same time, it supplies more pertinent information regarding the attitudes, ideals, and lives of these college graduates than has ever been collected in one volume. Although the book was undoubtedly written for popular consumption, it could well serve as a text for a graduate course in educational sociology. The analysis of the survey data was prepared by the Columbia University Bureau of Applied Social Research.

Modern Methods In Secondary Education

Jean D. Grambs and William J. Iverson. New York: William Sloane Associates, 1952, 562 pages.

Although the preface to this contribution implies that it is written for the inexperienced teacher, it will be welcomed by seasoned teachers and administrators as well. This is not another "ivory tower" approach to methods in secondary education but most realistic in that it suggests not only what to do but how to do it. This is accomplished hrough an application of methodology drawn from anthropology, sociology, psychology, and political science.

The authors show a keen understanding of the changing role of the secondary school in American life. They call attention to the fact that for four-fifths of the nation's youth the secondary school provides the last opportunity for general education. With this majority in mind, they suggest the type of instruction and activities which will result in good workers, good parents, and good citizens. At no time do the authors lose sight of the fact that in a democracy each of its citizens has enduring worth and that there is an ever-present need for differentiated capacities.

The book is well documented and, used as a guide for student teachers or beginning teachers, will help them, as well as their students, in realizing their potentialities.

Childhood Problems and the Teacher

Charlotte Buhler, Faith Smitter, and Sybil Richardson. New York: Henry Holt and Company, 1952, 372 pages.

This volume was designed to help the average classroom teacher understand the behavior dynamics of children, to suggest intelligent procedures for dealing with the less serious problems and to describe the types of cases where specialized assistance will be required. The authors are Charlotte Buhler, internationally recognized specialist in child development and former Professor of Psychology at the University of Vienna, and two well-known California school psychologists, Faith Smitter and Sybil Richardson. A chapter on remedial work was prepared by an experienced remedial teacher, Franklyn Bradshaw of the Monrovia City (California) Schools.

The reader's interest is constantly stimulated by the abundant use of case materials. Almost every page contains some reference to one or more of the 114 children whose problems are discussed in the book. These children range in maturity from preschool to adolescence. A special index lists the case summaries by type of difficulty. Analytical tables indicate the relationship of the nature of each child's problem to the factors present in his home and school environment.

An unusual but attractive feature of the book is the large number of reproductions of children's drawings, finger paintings and other examples of creative expression. In the accompanying text interpretations are presented for each picture showing how the child's personal dynamics are revealed through projection.

The volume is simply and clearly written and will be welcomed by the classroom teacher who not only wishes to learn "what is wrong with Jim or Mary" but who desperately asks, "What can I *do* to help them?"

Education in the United States of America

U. S. Office of Education Special Series No. 3. Washington: Federal Security Agency, 1951, 62 pages.

This monograph, according to U. S. Commissioner of Education Earl J. McGrath, was designed to give visitors from other lands a general background of our educational system which will help them interpret what they see and hear as they visit our schools and talk to teachers, parents, and children. Condensed into 62 pages is a description of the American school system; valuable statistics are included on enrollments, costs, types of districts, etc. Also included in the monograph is a glossary of some of the most common terms used in describing our educational system. Although intended for foreign visitors, the monograph should prove to be equally valuable as a reference source in public schools and in teacher education institutions.

The Financing of State Departments of Education

Fred F. Beach and Clayton D. Hutchins. U. S. Office of Education Miscellany No. 15. Washington: Federal Security Agency, 1951, 83 pages.

This report was prepared with the cooperation of the Study Commission of the National Council of Chief State School Officers. It constitutes the third publication in the state department of education series. Two already issued are: *The Structure of State Departments of Education,* 1949, (50 cents) and *The Functions of State Departments of Education,* 1950, (40 cents).

The Financing of State Departments of Education provides basic information on current practices for all states, analyzes common elements of development, and sets forth basic issues which are yet unresolved. No comprehensive study of the financing of state departments of education has previously been made.

This study should be helpful to state legislators, members of state boards of education, chief State school officers and their staffs, students of administration, and others concerned with state financial administration.

Principles and Techniques of Guidance

D. Welty Lefever, Archie M. Turrell, and Henry I. Weitzel. New York: Ronald Press, Revised Edition, 1950, 577 pages.

Principles and Techniques of Guidance is a revision of the widely used 1941 publication by the same authors. The volume presents a well-rounded and balanced treatment of the basic principles which underlie the development of school guidance services. The authors view guidance as being concerned with the total personal growth of individuals but at the same time recognize the special problems which are frequently involved in aiding individuals to solve somewhat specialized problems such as those in vocational areas. They stress the importance of the classroom teacher's guidance functions and also recognize the proper contributions of the guidance worker with specialized training. One part of the volume deals with the group approach to guidance, another with the functions and techniques of individual counseling.

The revised edition gives added emphasis to the procedures through which desired goals can be achieved. Specific suggestions for the classroom teacher and helpful references to source units are included. Case study materials and descriptions of practices used in schools appear at appropriate points throughout the volume. For instance, Chapter 17 on "Placement and Follow-Up" describes placement and follow-up procedures which have been tested through continued use in the Pasadena schools.

Of special interest to many readers will be the chapter on evaluation which sets forth the principles of evaluation, reviews the literature, and describes several specific evaluative studies.

Evaluating Pupil Progress

Henry W. Magnuson, Carl A. Larson, and Thomas A. Shellhammer. Sacramento: California State Department of Education Bulletin, Vol. XXI, No. 6, April 1952, 184 pages.

Prepared by the research staff of the California State Department of Education, this monograph emphasizes the instructional values to be derived from an all-inclusive program of evaluation. Its major purpose is to assist teachers in gathering and interpreting evidences of growth in the skills, knowledges, attitudes, and understandings that receive emphasis in the modern program of education. Over 150 supervisors and directors of instruction, superintendents, teachers, college deans, and representatives of lay groups reviewed, criticized, and supplemented the original manuscript. Some of the topics discussed in the monograph are: (1) the role of evaluation in education; (2) testing in an evaluation program; (3) appraising capacity for learning; (4) appraising personality development; (5) evaluating attitudes; (6) defining and observing pupil behavior; (7) techniques to appraise pupil behavior; (8) reporting pupil progress, etc.

Student Activities In Secondary Schools

Edgar G. Johnston and Roland C. Faunce. New York: Ronald Press, 1952, 369 pages.

The authors of this volume have made clear that they believe that important educational values are to be found in the student activities program. They have given a re-appraisal of the "extra-curricular program" in the light of generally accepted educational objectives, showing dangers and weaknesses as well as values.

This book should be of particular value to administrators, counselors and teachers who are seeking enrichment programs. It gives not only the why of enrichment but the how and the what. The chapters on "Characteristic Needs of Youth" and "Pupil Participation in the Administration of the School" are rich in suggestions for pupil participation. Activities which satisfy civic-political needs, personal growth needs, and social development needs are given. Other chapters are devoted to pupil participation in assemblies, clubs, social life, school publications, athletics, speech, music, outdoor education, school and community relationships, and the evaluation of student activities. The chapter on "Evaluating Student Activities" cites several significant studies in this area.

The suggestions for further reading which follow each chapter are presented in the form of a carefully selected and annotated bibliography.

Education In Rural and City School Systems: Some Statistical Indices for 1947–48

Rose Marie Smith. U. S. Office of Education Circular No. 329. Washington: Federal Security Agency, 1951, 13 pages.

A continuous demand for statistics of schools in rural vs. urban areas has been expressed by educators and others active in improving our schools. Pertinent statistics were first published by the Office of Education for the school year 1929–30, and biennial studies were made from that time, ending with the year 1941–42. This publication is the first since the 1941–42 report and includes data from 36 States.

State Provisions for Financing Public-School Capital Outlay Programs

Erick L. Lindman, Clayton D. Hutchins, Edgar L. Morphet, and Theodore L. Reller. U. S. Office of Education Bulletin 1951, No. 6. Washington: Federal Security Agency, 170 pages.

This study constitutes the first comprehensive effort to analyze existing policies and practices of 19 States which participate in the financing of local schoolhouse construction. It presents evidence pointing to the need for properly developed State programs of financial support for capital outlay and summarizes some of the significant developments in this area. The Office of Education report of the study also explains the plans now in operation, analyzes those plans to show some of the strong and weak points, and presents some of the criteria that can safely be followed on the basis of experience and evidence collected to date. Attention is centered primarily on the financing of public-school plant programs.

The Preparation and Training of Pupil Personnel Workers

James C. Stone and Others. Sacramento: California State Department of Education Bulletin, Vol. XI, No. 5, April 1952, 85 pages.

This bulletin outlines the work of a special committee appointed by the State Department of Public Instruction to study the role of pupil personnel workers and to present its conclusions and recommendations concerning the development of new credentials in this general field. Topics treated in the bulletin are: (1) should California certificate pupil personnel workers?; (2) a basic method of research; (3) report of subcommittee studying the school social worker; (4) report of sub-committee studying the child welfare and attendance worker; (5) report of subcommittee studying the school counselor; (6) report of sub-committee studying the school psychologist and psychometrist; (7) report of the research sub-committee; and (8) conclusions and recommendations in credentials for pupil personnel services.

Georgia Sachs Adams Vindicated

In issuing its report, "The Pasadena Story," the NEA Defense Commission claimed that research department of the Pasadena schools had embarrassed the administration by having submitted faulty cost estimates. The statement was challenged by Dr. Adams, who held the title of director of research at the time of the NEA's investigation. After reviewing the original testimony and further facts supplied by Dr. Adams, the Defense Commission concluded that its statement was unwarranted. The retraction was published in the March 1952 Defense Bulletin, a regular publication of the Defense Commission. One of the concluding statements in the Bulletin is to the effect that "our investigation has shown that Mrs. Adams is regarded by her colleagues as a thoroughly reliable research person."

Program Completed for Fourth Annual Statewide Research Conference

The report of the Research Conference program committee was approved at the April 18 quarterly meeting of the State Advisory Council on Educational Research which was held at the University of Southern California. The report was presented by Jean D. Grambs and Lucien Kinney, co-chairmen.

The theme for the 1952 Conference will be: "How Good Are Our Schools? Challenges to Research." The Conference will be held at the Leamington Hotel, Oakland, on November 7 and 8. The Friday program will include a symposium session, the Conference Luncheon, section meetings in the afternoon, a general session in the evening. A second symposium session will be held on Saturday morning. Invitations have been extended to leading research people, both in-state and out-of-state, to serve as conference participants.

It is expected that all of the larger California school districts and county school departments will send staff representatives to the 1952 Research Conference. Invitations have been extended also to all of the California colleges and universities. Those who desire to attend the conference, but who have not received a special invitation, should contact Frank W. Parr, chairman, State Advisory Council on Educational Research, 693 Sutter Street, San Francisco 2, California.

MASTERS THESES

[The following list of theses from Immaculate Heart College was received too late to be included in the annual classified bibliography of California theses and dissertations which was published in the May 1952 issue of the *Journal.* — Ed.]

Historical and Comparative Education

M. Alexandria, Sister (C.S.C.), *Changes in Teaching Biology in High School, 1940–1950.* (I.H.C.)

M. Martin, Sister (I.H.M.), *History of Catholic Elementary Education in the Archdiocese of Los Angeles, 1940–1950.* (I.H.C.)

M. Philomena, Sister (I.H.M.), *Trends and Changes in Teaching French in High School, 1940–1950.* (I.H.C.)

Curriculum

Bellew, Livinus Gerard, Brother, *A Latin Course for Juniors in Catholic High Schools.* (I.H.C.)

Dinneen, Charles Joseph, Jr., *A Study of the Physical Education Program in Selected Secondary Schools of Southern California.* (I.H.C.)

Singson, Caridad F., *A Survey of Home Economics Programs in the Secondary Schools of the United States.* (I.H.C.)

Growth and Development

Adams, Catherine Eugenia, *Developmental Reading Interests in Secondary Schools.* (I.H.C.)

Guidance and Counseling

Deering, Hilary Joseph, Brother, *Moral Problems of High School Boys.* (I.H.C.)

Giguette, Eulalia M., *Child Guidance Clinic for a Catholic School System.* (I.H.C.)

Educational Sociology and Philosophy

Mary Beata, Sister (I.H.M.), *A comparative Analysis of the Concept of Liberal Education as Expressed in Newman's Idea of a University and in the Harvard Report,* General Education in a Free Society. (I.H.C.)

Higher Education

Brennan, Edward, Rev. (C.M.), *A Study of Admission Program in a Seminary.* (I.H.C.)

Administration and Finance

Lee, Virginia, *The Improvement of Human Relations Through Parent–Teacher Conferences.* (I.H.C.)

General and Miscellaneous

Andre, Beverly C., *Geriatric Nursing Programs in Schools of Nursing.* (I.H.C.)

Austin Cusimano, Sister (D.C.), *Moral Problems Related to the Study of Psychiatry in Schools of Nursing.* (I.H.C.)